

TRANSMITTAL LETTER TO THE UNITED STATES  
DESIGNATED/ELECTED OFFICE (DO/EO/US)  
CONCERNING A FILING UNDER 35 U.S.C. 371

RBL0076

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR

09/831223

INTERNATIONAL APPLICATION NO.

PCT/EP99/08177

INTERNATIONAL FILING DATE

28/10/1999

PRIORITY DATE CLAIMED

09/11/1998

TITLE OF INVENTION

RELAY WITH COUPLING ELEMENT

APPLICANT(S) FOR DO/EO/US

ZSCHAU, Henning

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
  - a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
  - b. ☐ has been transmitted by the International Bureau.
  - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ A copy of the International Search Report (PCT/ISA/210).
8. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
  - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
  - b. ☐ have been transmitted by the International Bureau.
  - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
  - d. ☐ have not been made and will not be made.
9. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
10. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
11. ☒ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☒ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).

## Items 13 to 20 below concern document(s) or information included:

13. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☐ A substitute specification.
18. ☐ A change of power of attorney and/or address letter.
19. ☒ Certificate of Mailing by Express Mail
20. ☒ Other items or information:

Check No.

052105

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR) <div style="font-size: 24pt; font-weight: bold; margin-top: 5px;">097/831223</div>	INTERNATIONAL APPLICATION NO. <div style="font-weight: bold; margin-top: 5px;">PCT/EP99/08177</div>	ATTORNEY'S DOCKET NUMBER <div style="font-weight: bold; margin-top: 5px;">RBL0076</div>
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21. The following fees are submitted: <b>BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :</b> <div style="margin-top: 5px;"> <input type="checkbox"/> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO ..... \$1,000.00  <input checked="" type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO ..... \$860.00  <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO ..... \$710.00  <input type="checkbox"/> International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) ..... \$690.00  <input type="checkbox"/> International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) ..... \$100.00         </div> <div style="text-align: right; margin-top: 5px;"> <b>ENTER APPROPRIATE BASIC FEE AMOUNT =</b> </div> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 60%;">Surcharge of \$130.00 for furnishing the oath or declaration later than months from the earliest claimed priority date (37 CFR 1.492 (e)).</td> <td style="width: 10%; text-align: center;"> <input type="checkbox"/> 20    <input type="checkbox"/> 30         </td> <td style="width: 30%; text-align: right;">\$0.00</td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <th style="width: 20%;">CLAIMS</th> <th style="width: 20%;">NUMBER FILED</th> <th style="width: 20%;">NUMBER EXTRA</th> <th style="width: 20%;">RATE</th> <th style="width: 40%;"></th> </tr> <tr> <td>Total claims</td> <td style="text-align: center;">10 - 20 =</td> <td style="text-align: center;">0</td> <td style="text-align: center;">x \$18.00</td> <td style="text-align: right;">\$0.00</td> </tr> <tr> <td>Independent claims</td> <td style="text-align: center;">1 - 3 =</td> <td style="text-align: center;">0</td> <td style="text-align: center;">x \$80.00</td> <td style="text-align: right;">\$0.00</td> </tr> </table> <div style="margin-top: 5px;"> <input type="checkbox"/> Multiple Dependent Claims (check if applicable).         </div> <div style="text-align: right; margin-top: 5px;"> <b>TOTAL OF ABOVE CALCULATIONS =</b> </div> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 60%;">Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28) (check if applicable).</td> <td style="width: 10%; text-align: center;"> <input type="checkbox"/> </td> <td style="width: 30%; text-align: right;">\$0.00</td> </tr> </table> <div style="text-align: right; margin-top: 5px;"> <b>SUBTOTAL =</b> </div> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 60%;">Processing fee of \$130.00 for furnishing the English translation later than months from the earliest claimed priority date (37 CFR 1.492 (f)).</td> <td style="width: 10%; text-align: center;"> <input type="checkbox"/> 20    <input type="checkbox"/> 30         </td> <td style="width: 30%; text-align: right;">\$0.00</td> </tr> </table> <div style="text-align: right; margin-top: 5px;"> <b>TOTAL NATIONAL FEE =</b> </div> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 60%;">Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) (check if applicable).</td> <td style="width: 10%; text-align: center;"> <input type="checkbox"/> </td> <td style="width: 30%; text-align: right;">\$0.00</td> </tr> </table> <div style="text-align: right; margin-top: 5px;"> <b>TOTAL FEES ENCLOSED =</b> </div> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 60%;"></td> <td style="width: 10%;"></td> <td style="width: 30%; text-align: right;">\$860.00</td> </tr> <tr> <td></td> <td style="text-align: right;">Amount to be refunded</td> <td style="text-align: right;">\$</td> </tr> <tr> <td></td> <td style="text-align: right;">charged</td> <td style="text-align: right;">\$</td> </tr> </table>	Surcharge of \$130.00 for furnishing the oath or declaration later than months from the earliest claimed priority date (37 CFR 1.492 (e)).	<input type="checkbox"/> 20 <input type="checkbox"/> 30	\$0.00	CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		Total claims	10 - 20 =	0	x \$18.00	\$0.00	Independent claims	1 - 3 =	0	x \$80.00	\$0.00	Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28) (check if applicable).	<input type="checkbox"/>	\$0.00	Processing fee of \$130.00 for furnishing the English translation later than months from the earliest claimed priority date (37 CFR 1.492 (f)).	<input type="checkbox"/> 20 <input type="checkbox"/> 30	\$0.00	Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) (check if applicable).	<input type="checkbox"/>	\$0.00			\$860.00		Amount to be refunded	\$		charged	\$	<div style="text-align: center; font-weight: bold; margin-top: 5px;">CALCULATIONS    PTO USE ONLY</div>
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<input checked="" type="checkbox"/> A check in the amount of <b>\$860.00</b>	to cover the above fees is enclosed.
<input type="checkbox"/> Please charge my Deposit Account No. _____	in the amount of _____ to cover the above fees.
A duplicate copy of this sheet is enclosed.	
<input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. <b>02-0385</b>	A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

John F. Hoffman BAKER & DANIELS 111 East Wayne Street, Suite 800 Fort Wayne, IN 46802  TX: (219) 424-8000 FAX: (219) 460-1700	<div style="text-align: center;">           SIGNATURE  <b>JOHN F. HOFFMAN</b>          NAME  <b>26,280</b>          REGISTRATION NUMBER  <b>May 8, 2001</b>          DATE       </div>
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of  
Henning Zschau  
Serial No.  
Filed:  
Title: RELAY WITH COUPLING ELEMENT

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)  
) Group:  
) Examiner:

**PRELIMINARY AMENDMENT DELETING  
MULTIPLE DEPENDENT CLAIMS**

Assistant Commissioner of Patents  
Washington, DC 20231

Sir:

Prior to calculating the filing fee, please enter the following amendments to the application.

**IN THE CLAIMS**

- In claim 3, line 1, delete "one of claims 1 or 2" and substitute therefor --claim 1--.  
In claim 4, line 1, delete "one of claims 1 or 2" and substitute therefor --claim 1--.  
In claim 5, line 1, delete "one of claims 1 to 4" and substitute therefor --claim 1--.  
In claim 7, line 1, delete "one of claims 1 to 6" and substitute therefor --claim 1--.  
In claim 8, line 1, delete "one of claims 6 or 7" and substitute therefor --claim 6--.  
In claim 10, line 1, delete "one of claims 1 to 9" and substitute therefor --claim 1--.

Please add the following new claims:

--11. Relay according to claim 2, characterized in that the coupling of the coupling element is constructed locking and again releasable.

12. Relay according to claim 2, characterized in that the coupling of the coupling element is constructed rigid.

13. Relay according to claim 2, characterized in that the coupling element consists of an insulating material and has at least one partition wall insulatingly separating the contact springs of the respective coupled relays, on which (partition wall) lateral projections are molded which engage into allocated receiving openings on the respective spring bracket of the respective coupled relays.

14. Relay according to claim 3, characterized in that the coupling element consists of an insulating material and has at least one partition wall insulatingly separating the contact springs of the respective coupled relays, on which (partition wall) lateral projections are molded which engage into allocated receiving openings on the respective spring bracket of the respective coupled relays.

15. Relay according to claim 4, characterized in that the coupling element consists of an insulating material and has at least one partition wall insulatingly separating the contact springs of the respective coupled relays, on which (partition wall) lateral projections are molded which engage into allocated receiving openings on the respective spring bracket of the respective coupled relays.

16. Relay according to claim 2, characterized in that parallel to the lengthwise axes of the receiving openings, in the respective spring brackets of the relays there are arranged slots opened toward the face side, into which the passive contact springs are thrust.

17. Relay according to claim 3, characterized in that parallel to the lengthwise axes of the receiving openings, in the respective spring brackets of the relays there are arranged slots opened toward the face side, into which the passive contact springs are thrust.

18. Relay according to claim 4, characterized in that parallel to the lengthwise axes of the receiving openings, in the respective spring brackets of the relays there are arranged slots opened toward the face side, into which the passive contact springs are thrust.

19. Relay according to claim 5, characterized in that parallel to the lengthwise axes of the receiving openings, in the respective spring brackets of the relays there are arranged slots opened toward the face side, into which the passive contact springs are thrust.

20. Relay according to claim 6, characterized in that parallel to the lengthwise axes of the receiving openings, in the respective spring brackets of the relays there are arranged slots opened toward the face side, into which the passive contact springs are thrust.

Respectfully submitted,

John F. Hoffman  
Registration No. 26,280

Attorney for Applicant

JFH/pmp

BAKER & DANIELS  
111 East Wayne Street, Suite 800  
Fort Wayne, IN 46802

Date: May 8, 2001

4/PRTS

09/831223

JC18 Rec'd PCT/PTO 08 MAY 2001

TRANSLATION

99/0817

Relay with coupling element

[0001] The invention relates to a relay with coupling element according to the generic term of patent claim 1. With such relays there is present the need to double or to triple the relay functions, in order to make a "twin relay" or a "triple relay" from a "single relay". Such a need is present, above all, in safety technology, where what is essential is that, in the event of a failure, for example in the fusing or blocking of contacts, there still always are parallel contacts present, which take over the switching function.

[0002] Another need lies in accommodating with as little as possible circuitry expenditure a plurality of relay contacts in the least possible space. Here too, it is necessary to transfer certain electric functions of the single relay to the twin relay produced from it, in order to avoid an undesired redundance. In this case it is desired, for example, that with a twin relay all the passive contact springs both of the one and also of the other spring box (Federbox) lie on the same electric potential. One does not want, however, to fit any faulty wiring on a switching plate (Schaltplatine), which fulfills this requirement, but the contact springs should be directly electrically connected with

one another.

[0003] Underlying the invention therefore, is the problem of further developing a relay of the type mentioned at the outset, in such manner that without circuitry expenditure it can be developed into a twin relay or a triple relay.

[0004] For the solution of the problem posed, the relay is characterized by the technical teaching of claim 1.

[0005] An essential feature is that according to the invention a coupling element is provided, which mechanically couples several spring brackets with one another. In this manner, a simple relay can be rapidly developed, over the connection and by means of a coupling element, into a multiple relay, such as a twin relay or a triple relay, for example.

[0006] The rapid mechanical connecting by means of a coupling element, therefore, is claimed as an essential feature of the present invention.

[0007] In a further development of the invention, it is provided that the coupling element simultaneously also carries in itself the electrical through-connection between the spring brackets, so that, therefore, an externally lying circuitry expenditure is avoided (for example over a switching plate on

which the relays are seated with their connecting points), and that with the aid of the mechanical coupling of the coupling element, also simultaneously, the electrical coupling of the spring brackets to be connected is established. In a preferred further development of the invention, it is provided here that the electrical coupling of the spring brackets to be connected occurs over the passive contact springs. For this purpose, it is provided that no longer individual, passive contact springs are allocated to the respective spring bracket, but that a double contact spring allocated to both spring brackets is provided, which double contact spring consists of two individual contact springs that are connected with one another by means of an electrically conducting connection web. Therewith there is present the advantage that such a double contact spring is connected first with the coupling element and that the coupling element, then, is connected with the spring brackets to be connected in such manner that the one spring of the double contact spring forms, for example, the passive contact spring of the one spring bracket, while the other spring of the double contact spring forms the other passive contact spring of the other spring bracket. Both contact springs here are on electrically equal potential by reason of their electrical connection over the connection web, which pervades the contact element.

[0008] The definition given here of active and passive

contact springs must not be understood as restricting protective rights. On the contrary, instead of the here-described passive contact springs, there also lies within the scope of the invention the possibility of connecting the active contact springs electrically conductively by means of a contact element over a coupling, by the means that in each case on one side of the coupling element there is arranged the respective allocated contact spring, and the electrically conductive connection between these contact springs is brought about through a connection web which pervades the coupling element and is fastened with this.

[0009] In a preferred development of the invention it is provided that the coupling of the coupling element is constructed locking with, and again releasable from, the spring brackets to be connected.

[0010] In another development of the invention it is provided that the coupling of the coupling element with the spring brackets is made rigid (fest). There can be used here, for example, an adhesive, a melting or some other fluid connection.

[0011] An especially compact construction is yielded if the active and passive contact springs are arranged at an angle of 90°.



[0012] For the electrical potential separation between the two spring brackets it is preferred incidentally if the coupling element consists of an insulating material and has at least one partition wall running parallel to the contact rows of the relay, on which partition wall lateral projections are molded, which engage in allocated receiving openings on the respective spring bracket.

[0013] Between the lateral projections of the partition wall, grooves are formed which are suited for the reception of the contact springs. On the other hand, after slots are arranged parallel to the lengthwise axes of the reception openings in the respective spring bracket opened toward the face side, there, the passive contact springs can be slid in.

[0014] The inventive object of the present invention is yielded not only from the object of the individual patent claims, but also from the combination of the individual patent claims among one another.

[0015] All the indications and features disclosed in the documents, included in the abstract, especially the spatial formation represented in the drawing, are claimed as essential to the invention insofar as they are novel individually or in combination with respect to the state of the art.

[0016] In the following, the invention is explained in detail with the aid of drawings representing only one mode of execution. For the drawing and its description there appear further features and advantages essential to the invention.

[0017] In the drawing:

Fig. 1 shows schematically an individual relay,  
 Fig. 2 schematically the coupling of two individual relays with a coupling element,  
 Fig. 3 the assembled state of the twin relay  
 Fig. 4 an exploded view in comparison to Fig. 3, with representation of different contact springs.

[0018] The individual relay consists of a spring bracket 1, on which there is arranged the drive 5. On the spring bracket 1 there is arranged, lying, an active contact spring 2, which is actuated by an actuator 4. Standing in the spring bracket there is arranged in each case a passive contact spring 3. All the contact sets are arranged in a contact series 25, the contact sets being separated from one another by allocated partition walls 12.

[0019] The respective passive contact spring rests here on a housing-fast support web 11. The drive system is contacted over a connecting pin 6 (led out downward), just as the active and passive contact springs 2 are led out downward

through allocated connecting pins 7.

[0020] It is important, now, that the one face wall of the spring bracket 1 has a face-side, open, receiving openings 8, which are intended for the engagement of allocated projections 16 of a coupling element 14. Between the receiving openings 8 there are formed slots 9, into which the contact springs 3 are thrust from the face side and are supported there. The support occurs here by multiply offset grooves 10, so that there is ensured a favorable, stable support of the respective contact spring 3.

[0021] With the aid of the coupling element 14 there is now to be created from the single relay according to Fig. 1, a twin relay according to Figs. 2 to 4. For this, there is provided the coupling element 14 which essentially consists of a plastic part, which has a middle partition wall 15, the height of which about corresponds to the height of the spring bracket 1, 13. From the partition wall 12 there extend in each case in opposite directions the projections 16, which are intended for engagement into the allocated receiving openings 8 of the spring brackets 1, 13 to be connected.

[0022] The partition wall 15 has in its lower zone, an about T-shaped form with a cross-carrier 20 formed on the partition wall 15, on the underside of which cross-carrier

supporting ribs 17 are arranged. In this manner there is achieved a favorable, rigid, mechanical connection between the spring brackets 1, 13 to be connected, for according to the representation in Fig. 3 the cross-carrier 20 engages into an allocated, one-side open catch receptacle 19 and is fixed there with allocated snap-in means 18.

[0023] In addition a material-flow connection of the coupling element with the respective spring bracket 1, 13 can occur by the means that the parts touching and engaging into one another are cemented with adhesive.

[0024] Disposed laterally on the partition wall 15, there are further arranged spacer ribs 24, which are space-maintaining for the allocated face sides of the receiving openings 8. On these spacer ribs 24 there come to lie, therefore, the face sides of the receiving openings 8 of the respective spring brackets 1, 13.

[0025] If now there is to occur also an electrical connection over the mechanical connection of such spring brackets 1, 13, then, according to the invention, a double contact spring 21 is provided, such as is represented in Fig. 4. It consists of the earlier-mentioned passive contact springs 3, which are joined with one another by means of an electrically conductive connecting web 22.

[0026] For the assembling, therefore the double contact spring 21 is thrust upward in arrow direction 26 against the underside of the coupling element 14, so that the connecting web comes into engagement with the grooves 23, between the projections 16.

[0027] Now, the right-side spring bracket 1 is thrust in arrow direction 27 against the coupling element 14, so that the right contact spring 3 is slid into the slot 9 on the spring bracket 1, and simultaneously the projections 16 engage into the receiving openings 8 on the spring bracket.

[0028] In an analogous manner there takes place the connection with the oppositely lying spring bracket 13.

[0029] From this it is evident that now, besides the mechanical coupling of the spring brackets 1, 13, there has also occurred an electric through-connection over the contact springs 3,3, electrically connected with one another. Hereby a substantial expenditure in circuitry can be spared, for it is no longer necessary to bring about the through-connection of the contact springs with the aid of the connection pins 7 over a switching plate (not shown).

## Legends for the Figures

1. Spring bracket
2. Contact spring (active)
3. Contact spring (passive)
4. Actuating/actuator
5. Drive
6. Connecting pins
7. Connecting pins
8. Receiving opening
9. Slot
10. Groove
11. Support web
12. Partition wall
13. Spring bracket
14. Coupling element
15. Partition wall
16. Projection
17. Snap-in means
18. Catch receptacle
19. Catch receptacle.
20. Cross carrier
21. Double contact spring
22. Connecting web
23. Groove
24. Spacer rib

- 25. Contact series/row
- 26. Arrow direction
- 27. Arrow direction

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## Patent Claims

1. Relay with coupling element consisting of at least one spring bracket (1, 13) in which a drive (5) is arranged, which, over an actuator (4) acts on at least one active contact spring (2) which cooperates with at least one passive contact spring (3)  
anchored in the spring bracket (1, 13), characterized in that several spring brackets (1, 13) are mechanically coupled with one another by means of a coupling element (14).
2. Relay according to claim 1, characterized in that several spring brackets (1,13) are also electrically coupled with the coupling element (14).
3. Relay according to claim 1 or 2, characterized in that the coupling of the coupling element (14) is constructed so that it can be locked and again be released.
4. Relay according to claim 1 or 2, characterized in that the coupling of the coupling element (14) is constructed rigid.
5. Relay according to one of claims 1 to 4, characterized in that the coupling element consists of an insulating



material and has at least one partition wall (12) running parallel to the contact rows of the relay, on which partition wall lateral projections (16) are molded, which engage into allocated receiving openings (8) on the respective spring bracket (1, 13).

6. Relay according to claim 5, characterized in that between the lateral projections (16) of the partition wall (12) grooves (23) are formed, which are suited for the receiving of contact springs (3, 21).
7. Relay according to one of claims 1 to 6, characterized in that parallel to the lengthwise axes of the receiving openings (8) there are arranged in the respective spring brackets (1, 13) slots (9) open toward the face side, into which the passive contact springs (3, 21) are thrust.
8. Relay according to one of claims 1 to 8, characterized in that for the electrical connection of the passive contact springs (3) of the two spring brackets (1, 13) at least one double contact spring (21) is slidable into the grooves (23) of the coupling element (14).
9. Relay according to claim 8, characterized in that the electric coupling of the contact springs (3) of the two spring brackets (1, 13) occurs by the means that first at

least one double contact spring (21) is connected with the coupling element (14), and that then the coupling element is plugged together with the spring brackets.

10. Relay according to one of claims 1 to 9, characterized in that the active and the passive contact springs are arranged at an angle of  $90^\circ$  to one another.

## Abstract

A relay with coupling element consists of at least one spring bracket with an active and a with a passive contact spring. In order mechanically to couple several such relays with one another, a coupling element is provided which is pluggably connectable with the respective spring brackets of the relays in order to create a twin relay from a single relay.

If, beside the mechanical coupling, an electrical coupling also is to take place, then it is provided that at least one double contact spring is present, one part of which is allocated to the one spring bracket and the other part of which is allocated to the oppositely lying spring bracket, and the two contact springs are connected by the coupling element over an electrically conducting connection web.

TRANSLATION

INTERNATIONAL PRELIMINARY

EXAMINATION REPORT - Attachment

International file Ref. No. PCT/EP/99/08177

As closest-coming state of the art there is to be regarded DE-A-19800314. From this there is known a relay with the features of the generic term of Claim 1.

From this the object of the independent claims is distinguished by the features of the characterizing part of Claim 4.

The combination with these distinguished features brings it about that with a relatively slight circuitry expenditure a plurality of relay contacts are arranged on a relatively small space.

Main Claim

1. Relay with coupling element, which relay consists of at least one spring bracket (1 or 13), in which a drive (5) is arranged which acts over an actuator (4) on at least one active contact spring (2) which cooperates with at least one passive contact spring (3) anchored in the respective spring bracket (1, 13), the contact spring (2, 3) being electrically contactable over respective connection contacts (7), characterized in that the relay is mechanically couplable with at least one further relay of the same kind over respective coupling devices (8) of the spring bracket (1, 13) by means of a coupling element (14) constructed as a separate component, the electric connection contacts (7) of the contact springs (2, 3) of the relay being arranged in the zone of the respective coupling arrangements (8) and the coupled relays lying in mirror-image symmetry to the coupling element (14).

## Claims

1. [DELETED]
2. Relay according to claim 1, characterized in that the active (2) and/or passive (3) contact springs of the spring brackets (1 and 13) of these relays are also electrically coupled with one another over the separate coupling element (14).
3. Relay according to one of claims 1 or 2, characterized in that the coupling of the coupling element (14) is constructed locking and again releasable.
4. Relay according to one of claims 1 or 2, characterized in that the coupling of the coupling element (14) is constructed rigid.
5. Relay according to one of claims 1 to 4, characterized in that the coupling element (14) consists of an insulating material and has at least one partition wall (15) insulatingly separating the contact springs 2,3; 2,21) of

the respective coupled relays, on which (partition wall) lateral projections (16) are molded which engage into allocated receiving openings (8) on the respective spring bracket (1 and 13) of the respective coupled relays.

6. Relay according to claim 5, characterized in that between the lateral projections (16) of the partition wall (15) grooves (23) are formed, which are suited for the reception of contact springs (3; 21).
7. Relay according to one of claims 1 to 6, characterized in that parallel to the lengthwise axes of the receiving openings (8), in the respective spring brackets (1, 13) of the relays there are arranged slots (9) opened toward the face side, into which the passive contact springs (3, 21) are thrust.
8. Relay according to one of claims 6 or 7, characterized in that for the electrical connection of the passive contact springs (3) of the spring brackets (1, 13) of the two relays, at least one double contact spring (21) is slidable into the grooves (23) of the coupling element (14).
9. Relay according to claim 8, characterized in that the electric coupling of the passive contact springs of the two spring brackets (1, 13) occurs by the means that first at

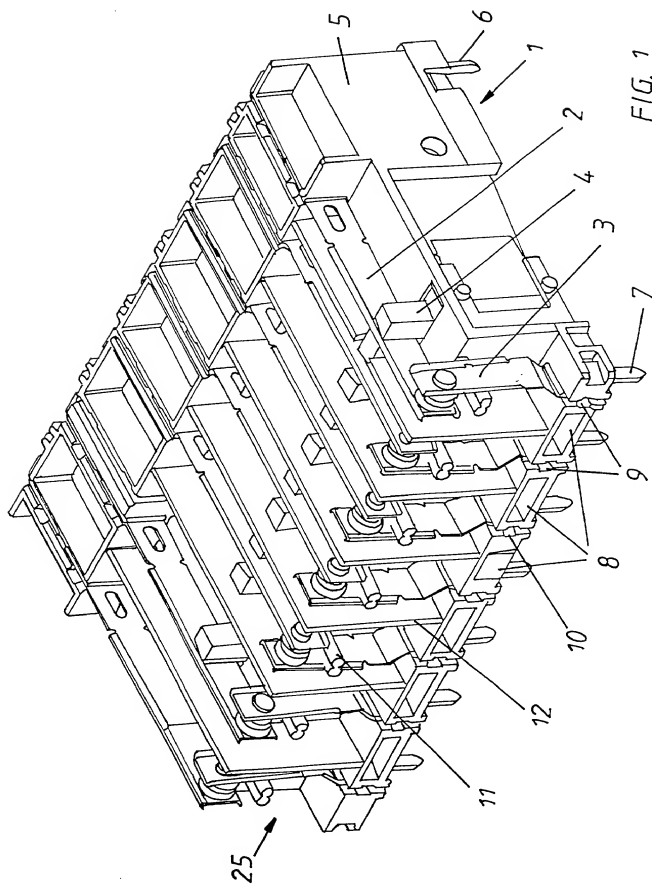
least one double contact spring (21) is connected with the coupling element (14) and that the coupling element (14) then is plugged together with the spring brackets (1, 13).

10. Relay according to one of claims 1 to 9, characterized in that the active (2) and the passive (3) contact springs are arranged at an angle of  $90^\circ$  to one another.

11. Relay according to one of claims 1 to 9, characterized in that the active (2) and the passive (3) contact springs are arranged at an angle of  $90^\circ$  to one another.



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2/4

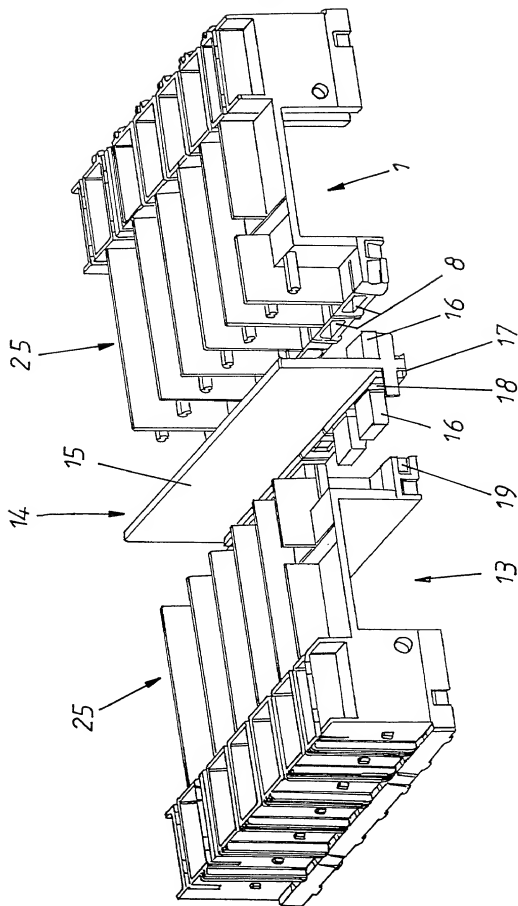
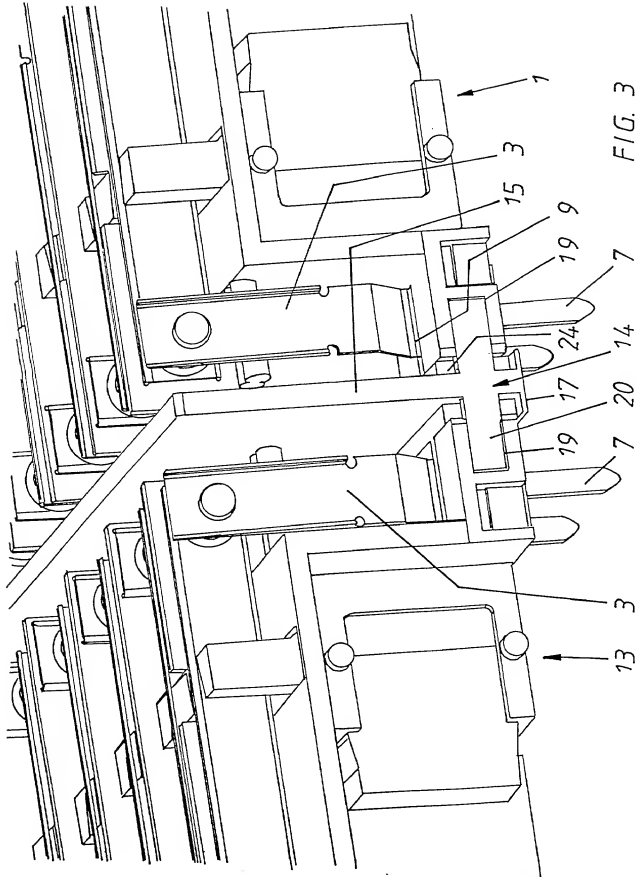
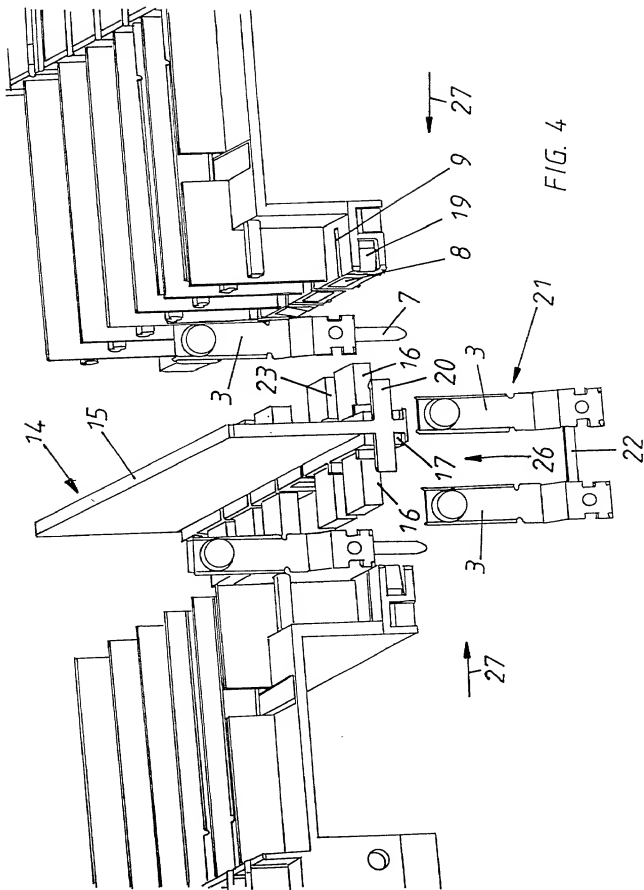


FIG. 2

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# Declaration and Power of Attorney for Patent Application

## Erklärung für Patentanmeldungen mit Vollmacht

### German Language Declaration

Als nachstehend benannter Erfinder erkläre ich hiermit an Eides Statt:

daß mein Wohnsitz, meine Postanschrift und meine Staatsangehörigkeit den im nachstehenden nach meinem Namen aufgeführten Angaben entsprechen, daß ich nach bestem Wissen der ursprüngliche, erste und alleinige Erfinder (falls nachstehend nur ein Name angegeben ist) oder ein ursprünglicher, erster und Miterfinder (falls nachstehend mehrere Namen aufgeführt sind) des Gegenstandes bin, für den dieser Antrag gestellt wird und für den ein Patent für die Erfindung mit folgendem Titel beantragt wird:

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated next to my name

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

RELAY WITH COUPLING ELEMENT

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☒ was filed on October 28, 1999  
as United States Application Number or PCT  
International Application Number PCT/EP99/08177  
and was amended on \_\_\_\_\_  
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Ich bestätige hiermit, daß ich den Inhalt der oben angegebenen Patentanmeldung, einschließlich der Ansprüche, die eventuell durch einen oben erwähnten Zusatzantrag abgeändert wurde, durchgesehen und verstanden habe.

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(Page 1 of 3)

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## Prior Foreign Applications

(Frühere ausländische Anmeldungen)

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(Nummer)	(Land)
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FCT/EP95/08177	28 Oct 1999
(Application No.)	(Filing Date)
(Aktenzeichen)	(Anmeldetag)
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(Application No.)	(Filing Date)
(Aktenzeichen)	(Anmeldetag)

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Priority Not Claimed  
Priorität nicht beansprucht

09/11/1998	<input type="checkbox"/>
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(Tag/Monat/Jahr der Anmeldung)	
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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith: (list name and registration number)

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Vor- und Zuname des zweiten Mitfinder (falls zutreffend)		Full name of second joint inventor, if any	
Unterschrift des zweiten Erfinders	Datum	Second Inventor's signature	Date
Wohnsitz		Residence	
Staatsangehörigkeit		Citizenship	
Postanschrift		Post Office Address	

(Im Falle dritter und weiterer Mitfinder Mitfinder sind die entsprechenden Informationen und Unterschriften hinzuzufügen.)

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